**In the Claims:**

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1. (Currently Amended) A method for carrying out the continuous polymerization of a monomer in a carbon dioxide reaction medium, said method comprising the steps of:

(a) providing an apparatus including a continuous reaction vessel and a separator, wherein said reaction vessel is configured to provide a dimensionless exit age distribution function ($E(\Theta)$) which reaches a maximum value between about $\Theta = 0$ and about $\Theta = 0.3$ and thereafter declines monotonically after reaching its maximum value;

(b) carrying out a polymerization reaction in said reaction vessel by combining a monomer, an initiator, and a carbon dioxide reaction medium therein, wherein said reaction medium comprises liquid or supercritical carbon dioxide, and wherein said reaction produces a solid polymer product in said reaction vessel; then

(c) withdrawing a continuous effluent stream from said reaction vessel during said polymerization reaction, wherein said continuous effluent stream is maintained as a liquid or supercritical fluid; then

(d) passing said continuous effluent stream through said separator and separating said solid polymer therefrom while maintaining said effluent stream as a liquid or supercritical fluid; and then

(e) returning at least a portion of said continuous effluent stream to said reaction vessel while maintaining said effluent stream as a liquid or supercritical fluid at a pressure not more than about 100 psi less than the pressure in said reaction vessel, whereby the need for significant recompression of said continuous effluent stream prior to return to said reaction vessel is minimized.

2. (Original) A method according to claim 1, wherein said polymerization reaction is selected from the group consisting of precipitation, microemulsion, emulsion, suspension, and dispersion polymerization reactions.

3. (Original) A method according to claim 1, wherein said initiator is soluble in said liquid or supercritical reaction medium.

4. (Original) A method according to claim 3, wherein said initiator is toxic.

5. (Original) A method according to claim 1, wherein said reaction vessel is a stirred tank reactor.

6. (Original) A method according to claim 1, wherein said reaction vessel is an ideal stirred tank reactor.

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7. (Original) A method according to claim 1, wherein said reaction vessel is a continuous loop reactor.

8-9. (Cancelled)

10. (Original) A method according to claim 1, wherein the monomer is a vinyl monomer.

11. (Original) A method according to claim 10, wherein the vinyl monomer is selected from the group consisting of an aromatic vinyl monomer, a conjugated diene monomer, an unsaturated acid monomer, a nitrogen-containing monomer, a non-aromatic unsaturated monocarboxylic ester monomer, and mixtures thereof.

12. (Original) A method according to claim 1, wherein the monomer is a fluorinated monomer.

13. (Original) A method according to claim 12, wherein the fluorinated monomer is

selected from the group consisting of a fluoroacrylate monomer, a fluorostyrene monomer, a fluoroalkylene oxide monomer, a fluoroolefin monomer, and mixtures thereof.

14. (Original) A method according to claim 1, wherein the monomer is vinylidene fluoride.

15. (Original) A method according to claim 1, wherein the monomer is acrylic acid.

16. (Original) A method according to claim 1, wherein the polymer is a copolymer.

B1 17. (Original) A method according to claim 1, wherein the initiator is a free radical initiator.

18. (Original) A method according to claim 17, wherein the initiator is selected from the group consisting of acetylcyclohexanesulfonyl peroxide; diacetyl peroxydicarbonate; diethyl peroxydicarbonate; dicyclohexyl peroxydicarbonate; di-2-ethylhexyl peroxydicarbonate; tert-butyl perneodecanoate; 2,2′-azobis(methoxy-2,4-dimethylvaleronitrile); tert-butyl perpivalate; dioctanoyl peroxide; dilauroyl peroxide; 2,2′-azobis(2,4-dimethylvaleronitrile); tert-butylazo-2-cyanobutane; dibenzoyl peroxide; tert-butyl per-2-ethylhexanoate; tert-butyl permaleate; 2,2-azobis(isobutyronitrile); bis(tert-butylperoxy) cyclohexane; tert-butyl peroxyisopropylcarbonate; tert-butyl peracetate; 2,2-bis(tert-butylperoxy) butane; dicumyl peroxide; di-tert-amyl peroxide; di-tert-butyl peroxide; p-methane hydroperoxide; pinane hydroperoxide; cumene hydroperoxide; tert-butyl hydroperoxide; and mixtures thereof.

19-32. (Cancelled)

33. (Original) A method for carrying out the continuous polymerization of a monomer in a carbon dioxide reaction medium, said method comprising the steps of:

(a) providing an apparatus including a continuous reaction vessel, a first separator, and a second separator;

(b) carrying out a polymerization reaction in said reaction vessel by combining a monomer, an initiator, and a carbon dioxide reaction medium therein, wherein said reaction medium comprises liquid or supercritical carbon dioxide, and wherein said reaction produces a solid polymer product in said reaction vessel; then

(c) withdrawing a continuous effluent stream from said reaction vessel during said polymerization reaction, passing said effluent stream through said first separator while maintaining said effluent stream as a liquid or supercritical fluid and separating said solid polymer therefrom; and then returning said effluent stream to said reaction vessel; and then

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(d) withdrawing a continuous effluent stream from said reaction vessel during said polymerization reaction, passing said effluent stream through said second separator while maintaining said effluent stream as a liquid or supercritical fluid and separating said solid polymer therefrom, and then returning at least a portion of said effluent stream to said reaction vessel, while concurrently removing said solid polymer separated in said first separator during said withdrawing step (c).

34. (Original) A method according to claim 33, wherein step (d) is followed by the step of: (e) repeating said withdrawing step (c) while concurrently removing said solid polymer separated in said second separator during said withdrawing step (d).

35. (Original) A method according to claim 33, wherein said polymerization reaction is selected from the group consisting of precipitation, microemulsion, emulsion, suspension, and dispersion polymerization reactions.

36. (Original) A method according to claim 33, wherein said initiator is soluble in said liquid or supercritical reaction medium.

37. (Original) A method according to claim 33, wherein said initiator is returned to said reaction vessel in said reaction medium after said step of passing said effluent stream through said separator.

38. (Original) A method according to claim 33, wherein said initiator is toxic.

39. (Original) A method according to claim 33, wherein said reaction vessel is a stirred tank reactor.

40. (Original) A method according to claim 33, wherein said reaction vessel is an ideal stirred tank reactor.

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41. (Original) A method according to claim 33, wherein said reaction vessel is a continuous loop reactor.

42. (Original) A method according to claim 33, wherein said reaction vessel is configured to provide a dimensionless exit age distribution function ($E(\Theta)$) which reaches a maximum value between about $\Theta = 0$ and about $\Theta = 0.3$ and thereafter declines monotonically after reaching its maximum value.

43. (Original) A method according to claim 33, wherein said reaction vessel is configured to provide a cumulative exit age distribution (F) of from about 0.45 to about 0.70 when $\Theta = 1$.

44. (Original) A method according to claim 33, wherein the monomer is a vinyl monomer.

45. (Original) A method according to claim 44, wherein the vinyl monomer is selected from the group consisting of an aromatic vinyl monomer, a conjugated diene monomer, an unsaturated acid monomer, a nitrogen-containing monomer, a non-aromatic unsaturated monocarboxylic ester monomer, and mixtures thereof.

46. (Original) A method according to claim 33, wherein the monomer is a fluorinated monomer.

47. (Original) A method according to claim 46, wherein the fluorinated monomer is selected from the group consisting of a fluoroacrylate monomer, a fluorostyrene monomer, a fluoroalkylene oxide monomer, a fluoroolefin monomer, and mixtures thereof.

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48. (Original) A method according to claim 33, wherein the monomer is vinylidene fluoride.

49. (Original) A method according to claim 33, wherein the monomer is acrylic acid.

50. (Original) A method according to claim 33, wherein the polymer is a copolymer.

51. (Original) A method according to claim 33, wherein the initiator is a free radical initiator.

52. (Original) A method according to claim 51, wherein the initiator is selected from the group consisting of acetylcyclohexanesulfonyl peroxide; diacetyl peroxydicarbonate; diethyl peroxydicarbonate; dicyclohexyl peroxydicarbonate; di-2-ethylhexyl peroxydicarbonate; tert-butyl perneodecanoate; 2,2′-azobis(methoxy-2,4-dimethylvaleronitrile); tert-butyl perpivalate; dioctanoyl peroxide; dilauroyl peroxide; 2,2′-azobis(2,4-dimethylvaleronitrile); tert-butylazo-2-cyanobutane; dibenzoyl peroxide; tert-butyl per-2-ethylhexanoate; tert-butyl permaleate; 2,2-

azobis(isobutyronitrile); bis(tert-butylperoxy) cyclohexane; tert-butyl peroxyisopropylcarbonate; tert-butyl peracetate; 2,2-bis(tert-butylperoxy) butane; dicumyl peroxide; di-tert-amyl peroxide; di-tert-butyl peroxide; p-methane hydroperoxide; pinane hydroperoxide; cumene hydroperoxide; tert-butyl hydroperoxide; and mixtures thereof.

53-68. (Cancelled)

69. (New) A method for carrying out the continuous polymerization of a monomer in a carbon dioxide reaction medium, said method comprising the steps of:

(a) providing an apparatus including a continuous reaction vessel and a separator wherein said reaction vessel is configured to provide a cumulative exit age distribution (F) of from about 0.45 to about 0.70 when $\Theta = 1$;

(b) carrying out a polymerization reaction in said reaction vessel by combining a monomer, an initiator, and a carbon dioxide reaction medium therein, wherein said reaction medium comprises liquid or supercritical carbon dioxide, and wherein said reaction produces a solid polymer product in said reaction vessel; then

(c) withdrawing a continuous effluent stream from said reaction vessel during said polymerization reaction, wherein said continuous effluent stream is maintained as a liquid or supercritical fluid; then

(d) passing said continuous effluent stream through said separator and separating said solid polymer therefrom while maintaining said effluent stream as a liquid or supercritical fluid; and then

(e) returning at least a portion of said continuous effluent stream to said reaction vessel while maintaining said effluent stream as a liquid or supercritical fluid at a pressure not more than about 100 psi less than the pressure in said reaction vessel, whereby the need for significant recompression of said continuous effluent stream prior to return to said reaction vessel is minimized.

70. (New) A method according to claim 69, wherein said polymerization reaction is selected from the group consisting of precipitation, microemulsion, emulsion, suspension, and dispersion polymerization reactions.

71. (New) A method according to claim 69, wherein said initiator is soluble in said liquid or supercritical reaction medium.

72. (New) A method according to claim 71, wherein said initiator is toxic.

73. (New) A method according to claim 69, wherein said reaction vessel is a stirred tank reactor.

74. (New) A method according to claim 69, wherein the monomer is a vinyl monomer.

75. (New) A method according to claim 74, wherein the vinyl monomer is selected from the group consisting of an aromatic vinyl monomer, a conjugated diene monomer, an unsaturated acid monomer, a nitrogen-containing monomer, a non-aromatic unsaturated monocarboxylic ester monomer, and mixtures thereof.

76. (New) A method according to claim 69, wherein the monomer is a fluorinated monomer.

77. (New) A method according to claim 76, wherein the fluorinated monomer is selected from the group consisting of a fluoroacrylate monomer, a fluorostyrene monomer, a fluoroalkylene oxide monomer, a fluoroolefin monomer, and mixtures thereof.

78. (New) A method according to claim 69, wherein the monomer is vinylidene

fluoride.

79. (New) A method according to claim 69, wherein the monomer is acrylic acid.

80. (New) A method according to claim 69, wherein the polymer is a copolymer.

81. (New) A method according to claim 69, wherein the initiator is a free radical initiator.

82. (New) A method according to claim 81, wherein the initiator is selected from the group consisting of acetylcyclohexanesulfonyl peroxide; diacetyl peroxydicarbonate; diethyl peroxydicarbonate; dicyclohexyl peroxydicarbonate; di-2-ethylhexyl peroxydicarbonate; tert-butyl perneodecanoate; 2,2′-azobis(methoxy-2,4-dimethylvaleronitrile); tert-butyl perpivalate; dioctanoyl peroxide; dilauroyl peroxide; 2,2′-azobis(2,4-dimethylvaleronitrile); tert-butylazo-2-cyanobutane; dibenzoyl peroxide; tert-butyl per-2-ethylhexanoate; tert-butyl permaleate; 2,2-azobis(isobutyronitrile); bis(tert-butylperoxy) cyclohexane; tert-butyl peroxyisopropylcarbonate; tert-butyl peracetate; 2,2-bis(tert-butylperoxy) butane; dicumyl peroxide; di-tert-amyl peroxide; di-tert-butyl peroxide; p-methane hydroperoxide; pinane hydroperoxide; cumene hydroperoxide; tert-butyl hydroperoxide; and mixtures thereof.

83. (New) A method for carrying out the continuous polymerization of a monomer in a carbon dioxide reaction medium, said method comprising the steps of:

(a) providing an apparatus including a continuous reaction vessel and a separator, wherein said reaction vessel is a continuous loop reactor;

(b) carrying out a polymerization reaction in said reaction vessel by combining a monomer, an initiator, and a carbon dioxide reaction medium therein, wherein said reaction medium comprises liquid or supercritical carbon dioxide, and wherein said reaction produces a solid polymer product in said reaction vessel; then

(c) withdrawing a continuous effluent stream from said reaction vessel during said polymerization reaction, wherein said continuous effluent stream is maintained as a liquid or supercritical fluid; then

(d) passing said continuous effluent stream through said separator and separating said solid polymer therefrom while maintaining said effluent stream as a liquid or supercritical fluid; and then

(e) returning at least a portion of said continuous effluent stream to said reaction vessel while maintaining said effluent stream as a liquid or supercritical fluid at a pressure not more than about 100 psi less than the pressure in said reaction vessel, whereby the need for significant recompression of said continuous effluent stream prior to return to said reaction vessel is minimized.